



ELECTRONIC TUBE REFERENCE

17RHH2

Voltage - Dual Triode (similar high frequency) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

TRIODE-TRIODE

Twin triode designed for VHF tuner service, providing functions for RF amplification, frequency conversion, and local-oscillator operation in television or radio receiving equipment.

GENERAL CHARACTERISTICS

BASE DESIGNATION	E9-1	BASE PINS	9
NOMINAL HEATER	17 V / 150 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Triode	
TRANSCONDUCTANCE	0.008 S
AMPLIFICATION FACTOR	36
MAXIMUM PLATE VOLTAGE	150 V
MAXIMUM PLATE DISSIPATION	2 W
MAXIMUM CATHODE CURRENT	20 mA
Repeated identical physical sections represented by one populated row.	

SECTION2 Triode	
TRANSCONDUCTANCE	0.008 S
AMPLIFICATION FACTOR	36
MAXIMUM PLATE VOLTAGE	150 V
MAXIMUM PLATE DISSIPATION	2 W
MAXIMUM CATHODE CURRENT	20 mA
Physical section restored under current one-row-per-physical-section policy.	

17RHH2 — Medium-Mu Twin Triode Vacuum Tube

The **17RHH2** is a specialized twin triode vacuum tube designed primarily for high-frequency applications in the VHF band. Characterized as both a medium-mu and high-mu twin triode in technical documentation, it is engineered for service as an RF amplifier, frequency converter, and oscillator. It is particularly suited for the tuners of transformer-less FM/AM radio receivers, where its high mutual conductance and efficient operation at low plate voltages are highly advantageous.

Mechanical Design and Heater Ratings

The 17RHH2 is constructed in a compact glass envelope utilizing an **E9-1 Small Button Noval 9-Pin** base. The tube is designed to operate in any mounting position, offering flexibility in physical chassis layouts.

The heater is designed for series-string or transformer-less receiver power supplies, requiring a specific current and voltage configuration:

Heater Parameter	Value
Heater Voltage (E_f)	17.0 V
Heater Current (I_f)	0.15 A
Heating Method	Indirect

Pin Configuration and Internal Shielding

The 17RHH2 features independent connections for both triode sections, along with an internal shield connected to a dedicated pin to minimize inter-section coupling at high frequencies. The pinout configuration, viewed from the bottom of the base, is as follows:

- **Pin 1:** Plate (Triode 2) — P_{T2}
- **Pin 2:** Grid (Triode 2) — G_{T2}

- **Pin 3:** Cathode (Triode 2) — $KT2$
- **Pin 4:** Heater — H
- **Pin 5:** Heater — H
- **Pin 6:** Plate (Triode 1) — $PT1$
- **Pin 7:** Grid (Triode 1) — $GT1$
- **Pin 8:** Cathode (Triode 1) — $KT1$
- **Pin 9:** Internal Shield — IS

Direct Interelectrode Capacitances

To facilitate stable operation in both grounded-cathode and grounded-grid configurations, the interelectrode capacitances are specified with an external shield connected. The internal shield on Pin 9, combined with proper external shielding, ensures extremely low capacitive coupling between the two triode plates.

Capacitance Parameter	Triode 1	Triode 2
Grid No. 1 to Plate (C_{gp})	1.2 pF	1.2 pF
Input, Grounded Cathode (C_{in})	3.3 pF	3.3 pF
Input, Grounded Grid (C_{in_gg})	5.6 pF	5.6 pF
Output, Grounded Cathode (C_{out})	1.3 pF	1.3 pF
Output, Grounded Grid (C_{out_gg})	2.4 pF	2.4 pF
Heater to Cathode (C_{hk})	2.5 pF	2.5 pF
Plate to Plate (C_{p1-p2})	≤ 0.01 pF (Max)	—

Typical Operating Characteristics

Under typical Class A operating conditions, the 17RHH2 exhibits high transconductance (mutual conductance) at a relatively low plate voltage, making it highly efficient for small-signal VHF amplification.

Parameter	Value
Plate Voltage (E_b)	90 V
Grid No. 1 Voltage (E_c)	-1 V
Plate Current (I_b)	8.5 mA

Parameter	Value
Transconductance (g_m)	8,000 μmhos
Amplification Factor (μ)	36
Grid No. 1 Cutoff Voltage (Approx. at $I_b = 10 \mu\text{A}$)	-5.5 V

Maximum Ratings (Design Center System)

The maximum ratings for the 17RHH2 are established under the Design Center System. Operating the tube beyond these limits may impair its performance and longevity.

- **Maximum Plate Voltage:** 150 V
- **Maximum Plate Dissipation:** 2.0 W
- **Maximum Total Cathode Current:** 20 mA
- **Maximum Grid No. 1 Circuit Resistance:** 500 k Ω
- **Peak Heater-Cathode Voltage:**
 - Heater negative with respect to cathode: 200 V
 - Heater positive with respect to cathode: 200 V (The DC component of this voltage must not exceed 100 V)

Characteristic Curves and Conversion Operation

The electrical behavior of the 17RHH2 is further defined by its characteristic curves under specific operating conditions:

Plate Current vs. Grid Voltage

The relationship between plate current and grid voltage is documented across a range of plate voltages (E_b) from 50 V to 150 V (specifically at 50 V, 75 V, 100 V, 125 V, and 150 V) with the heater operating at its nominal 17.0 V. These curves are bounded by a plate dissipation limit curve corresponding to the maximum rating of 2.0 W ($W_p = 2.0 \text{ W}$), ensuring that designers can select safe bias points across different plate supply voltages.

Frequency Converter and Mixer Performance

When utilized as a frequency converter or mixer, the 17RHH2's performance is characterized by its conversion transconductance relative to the local oscillator injection voltage. Under test conditions with a heater voltage of 17.0 V, grid bias of 0 V ($E_c = 0 \text{ V}$), and a grid resistor (R_g) of 250 k Ω :

- **Conversion Transconductance:** Plotted for plate voltages (E_b) of 75 V, 100 V, 125 V, and 150 V. The conversion transconductance peaks when the local oscillator injection voltage is between 3 V and 3.5 V_{RMS} . At a plate voltage of 150 V, the peak conversion transconductance reaches approximately 6,000 μmhos .

- **Average Plate Current:** Under the same mixing conditions ($E_c = 0$ V, $R_g = 250$ k Ω), the average plate current decreases monotonically as the oscillator injection voltage increases from 0 V to 7 V *RMS*. This behavior reflects the self-biasing action of the grid circuit as the injection voltage increases.

Technical Summary

The **17RHH2** is a high-performance, 9-pin noval twin triode optimized for VHF RF amplification, oscillation, and frequency conversion in transformer-less AM/FM receivers. Featuring a 17.0 V, 0.15 A heater, the tube is designed for series-string integration. With an internal shield providing excellent isolation between sections (plate-to-plate capacitance of 0.01 pF or less), it delivers a high transconductance of 8,000 μ mhos and an amplification factor of 36 at a moderate plate voltage of 90 V. Its design center ratings restrict plate voltage to 150 V and plate dissipation to 2.0 W per section, making it a highly capable and efficient choice for compact, transformer-less high-frequency receiver designs.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1963 Hitachi

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1963 HITACHI

Section 1 · Triode

CAPACITANCE

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Interelectrode capacitances published	1	See source table

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